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REMARKS

Claims 1 to 38 are currently pending. Claims 39-64 have been canceled. Claims 1, 22, and 32 are currently amended.

Claims 1 and 22 are amended for clarity as suggested by the Examiner. Support for the amendment may be found, for example, in original claims 1 and 22.

Claim 32 is amended to correct an obvious typographical error (i.e., no period following "32").

Objections to the Specification

The disclosure stands as objected to because of the following informalities:

- (a) On page 3 at lines 31 and 32, page 4 at lines 13 and 22, and throughout the specification, all recitations of "vinylidene difluoride" should be changed to "vinylidene fluoride" according to the traditional wording used in the art, and refers to the Aldrich chemical catalog for a correct name.
- (b) On page 9 at line 23, recitation of " NH_4^+ " is improper and should be changed to " NH_4^+ ".

With regard to objection (a), Applicants submit that both vinylidene fluoride and vinylidene difluoride are well-accepted names for $\text{CH}_2=\text{CF}_2$. For example, the Chemical Abstracts Registry record for CAS No. 75-38-7 (enclosed Attachment A) lists both "vinylidene difluoride" and "vinylidene fluoride" as names for $\text{CH}_2=\text{CF}_2$. In addition, a web printout of page 1 of 6 from the National Institute for Occupational Health and Safety (NIOSH) Registry of Toxic Effects of Chemical Substances (RTECS) record for "ethylene, 1,1-difluoro", $\text{CH}_2=\text{CF}_2$, (enclosed as Attachment B) also lists "vinylidene difluoride" and "vinyl fluoride" as synonyms. It is therefore submitted that the term "vinylidene difluoride" is well recognized in the chemical art as referring to $\text{CH}_2=\text{CF}_2$. Further, a requirement to change all occurrences of the term through the specification, in addition to being unduly burdensome to Applicant, increases the chance that through inadvertent error both terms will appear in the specification and introduce a

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degree of confusion not currently. In view of the above, reconsideration and withdrawal of the objection are respectfully requested.

With regard to objection (b), Applicants thank the Examiner for pointing out this typographical error, and submit that the amendment to the specification presented hereinbefore overcomes the objection.

Objections to the Claims

Claims 1, 5, 13 and 22 stand objected to because of the following informalities:

(a) The Patent Office asserts that in claim 1, the phrase of "at least one of a sulfide, or polysulfide salt or anionic conjugate acid thereof, and a liquid vehicle" may be improper, and that the liquid vehicle may be confused as related to in "at least one of". The Examiner suggests using the phrase "a liquid vehicle, and at least one of a sulfide, or polysulfide salt or anionic conjugate acid thereof".

(b) The Patent Office asserts that in claim 1 at line 2, the use of 'preparable" may be improper. The examiner suggests using "prepared" or "formed", otherwise it is unclear whether or not it is obtained.

(c) The Patent Office asserts that in claim 5 at line 2, and claim 13 at line 2, all recitations of "vinylidene difluoride" should be changed to "vinylidene fluoride" according to the traditional wording used in the art.

(d) The Patent Office asserts that in claim 22 at line 1, recitation of "claim 17" should be changed to "claim 21" since "at least one thermoplastic polymer" is related to claim 21, not from Claim 17.

With regard to objection (a), it is submitted that the amendment to claim 1 overcomes the objection.

With regard to objection (b), it is submitted that the plain meaning of the term "preparable" (i.e., capable of being prepared) is clear in its scope. Thus, the phrase "modifying composition preparable from components" includes not only compositions made from the recited components, but also includes, for example, compositions in which the recited components were

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generated in situ by a chemical reaction of different components. Reconsideration and withdrawal of the rejection are respectfully requested.

With regard to objection (c), in view of the discussion with regard to the objection to the specification (a) above, Applicants respectfully request reconsideration and withdrawal of the objection.

With regard to objection (d), it is submitted that the amendment of claim 22 overcomes the rejection.

§ 102 Rejections

Claims 1-38 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Coggio et al. (US 6,080,487).

Regarding claim 1, the Patent Office asserts that Coggio et al. disclose that dehydrofluorination of a fluoropolymer film surface can be accomplished by surface treatment of the fluoropolymer film with solutions of various basic compounds with the presence of a phase transfer catalyst. The Patent Office further asserts that Coggio et al. also disclose that the basic compound useful as modifying agent can be either carbonate or hydroxide from potassium or sodium, the solvent can be naphthalene, water or THF, while the catalyst may include halides of tetrabutylammonium or tetraalkylphosphonium, and the like. The Patent Office notes that such basic compounds are related to anionic conjugate acid in term of acid conjugate base relationship. With respect to the limitation as "fluoropolymer has a backbone comprising subunits having the structure of $-\text{CH}_2\text{CFX}-$, wherein X represents H, Cl, or F", the Patent office asserts that Coggio et al. teach the claimed structure. The Patent office also asserts that Coggio et al. teach a heating temperature of around 40-100 °C. The Patent Office argues that Coggio et al. therefore anticipate the limitations of Claim 1.

Regarding Claims 2-15, the Patent Office asserts that Coggio et al. teach that various ethylenically co-monomers such as tetrafluoroethylene, VDF, CTFE, PAVE, or a di-olefin such as perfluoro-1,3-butadiene can be included for copolymerization in making fluoropolymers in this purpose, and that non-fluorinated monomers may be included.

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Regarding Claims 16-22 and 29-32, the Patent Office asserts that Coggio et al. disclose lamination and heat lamination method to process the film adhesion onto a substrate, and to bring different films together to form a multi-layer article.

Regarding Claims 33-38, the Patent Office asserts that Coggio et al. disclose the fluoropolymer can be processed in combination with not only just a single other hydrocarbon substrate, but also with other polymeric layers, particularly polyimides or polyacrylates.

Claims 23-28 stand rejected for the same reason as in the rejection of Claim 1.

Without agreeing to the Patent Office's characterization of Coggio et al., or admitting that the rejection is even proper, Applicants submit that Coggio et al. do not specifically teach "at least one of a sulfide or polysulfide salt or anionic conjugate acid thereof" as in instant claim 1. Therefore, claim 1 is not anticipated by Coggio et al. and is patentable. Claims 2-38 each add additional features to patentable claim 1, and are therefore likewise patentable.

Applicants further note that the present invention gives unexpected superior results as compared to those of Coggio et al. as evidenced, for example, on pages 18-20 of the specification in Table 2 wherein Example 3 has superior peel adhesion to Comparative Example 4, Example 4 has superior peel adhesion to Comparative Example 5, and Example 11 has superior peel adhesion to Comparative Example 7. Further, as reported on page 16 of the specification in Table 1, the surface composition of the treated surface of the fluoropolymer film when produced according to the present invention (e.g., see Examples 1-3) differs from the surface composition of the treated surface of the same fluoropolymer film when produced according to the method of Coggio et al. (e.g., see Comparative Examples 1-3). In contrast, the teachings of Coggio et al. are directed at methods for dehydrofluorinating the surface of a fluoropolymer film while minimizing grafting reactions (e.g., see col. 2, lines 2-26 and col. 4, lines 33-48).

In summary, the rejection of claims 1-38 under 35 U.S.C. § 102(b) as anticipated over Coggio et al. is overcome. Reconsideration and withdrawal of the rejection is respectfully requested.

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§ 103 Rejections

Claims 1-38 stand rejected under 35 U.S.C. § 103(a) as obvious over Fang (US 4,186,084) in view of Coggio et al. (US 6,080,487).

Regarding the limitation of parent claim 1, the Patent Office asserts that Fang discloses that fluoropolymers would become hydrophilic after chemically modified by reacting them with various sulfur- or phosphorous-containing compounds in some solvents. The Patent Office further asserts that Fang further disclose that the modifying agent compound can be M_2S_x salt of sulfide or polysulfide, while the solvent can be either DMF or DMAC. It is noted that heating temperature is around 172 °C. The Patent Office admits that with respect to the limitation as "fluoropolymer has a backbone comprising subunits having the structure $-CH_2CFX-$, wherein X represents H, Cl, or F", Fang only discloses using TFE, HFP, CTFE and BTFE but is silent of the claimed structure of $-CH_2CFX-$. The Patent Office further admits that Fang is also silent using a phase transfer catalyst in the composition. The Patent Office further asserts that Coggio et al. teach both limitations in the course of dehydrofluorination on a fluoropolymer film surface, and that the advantage is that such a fluoropolymer in the presence of a phase transfer catalyst can be effectively dehydrofluorinated and thereby to obtain some unsaturated double bonds on the surface so that the adhesion between fluoropolymer and substrate can be improved. The Patent Office further asserts that both modifying process disclosed by Fang and Coggio et al. are applied for improving fluoropolymer adhesion, and that in light of the fact that Coggio et al.'s fluoromonomer can have a unit of $-CH_2CFX-$ which is a species of the ethylenically copolymerizable fluorinated monomer genus, it is thereby functionally equivalent and exchangeable with fluoromonomers used by Fang.

The Patent Office argues that one having ordinary skill in the art would have found it obvious to include fluoromonomer having unit of $-CH_2CFX-$ as well as including a phase transfer catalyst in the chemical modification of fluoropolymer as taught by Coggio et al. The Patent Office further argues that one would expect that all embodiments in the genus would succeed based on functional equivalence and interchangeability. The Patent Office further argues that such a fluoropolymer with the presence of a phase transfer catalyst can produce a better

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adhesion between fluoropolymer and substrate due to the generation of some double bonds on the surface, and that a better product or film laminate can be thereby obtained.

The Patent Office incorporates by reference the above discussion regarding the disclosure of Coggio et al. of this office action in regard to the rejection Claims 1-38. Remaining Claims 2-38 stand rejected with the above rejection of Claim 1, the teaching of Coggio and from the disclosure of Fang.

Without agreeing to the Patent Office's characterization of Fang or Coggio et al., or admitting that the rejection is even proper, Applicants submit that one in possession of Fang would not be motivated to apply the teaching of Coggio et al. as set forth by the Patent Office.

For example, Fang is directed at hydrophilic materials useful for making ion-exchange membranes, especially diaphragms for electrolytic cells, particularly chlor-alkali cells used in the production of chlorine, hydrogen and sodium hydroxide from brine (e.g., see Fang in the Abstract). Fang reports that by chemically modifying certain fluoropolymer starting materials with sulfur- or phosphorus-containing compounds, the fluoropolymer starting materials are made hydrophilic (e.g., see Fang in col. 1, lines 23-27). Fang further teaches that the fluoropolymer starting materials are preferably selected so as to avoid possible alpha, beta elimination of hydrogen fluoride (e.g., see Fang in col. 3, line 64 to col. 4, line 9) under conditions found in some electrolytic cells. In contrast, the theory of Coggio et al. relies on dehydrofluorination (i.e., alpha, beta elimination of hydrogen fluoride) to generate double bonds along the polymer backbone (e.g., see Coggio et al. in col. 3, lines 8-39). It is thus unclear why one seeking to avoid elimination would seek to apply a reference that requires it, absent improper hindsight reasoning based on Applicant's own specification.

Further, while Coggio et al. disclose catalysts for dehydrofluorination (e.g., see col. 5, line 63-col. 6, line 8) there appears to be no indication in Coggio et al. that such catalysts would be useful in the methods of Fang, and especially in view of the above discussion regarding dehydrofluorination.

For at least these reasons claim 1 is patentable over Fang in view of Coggio et al. Claims 2-38 add additional features to patentable claim 1, and are therefore likewise patentable.

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In summary, the rejection of claims 1-38 under 35 U.S.C. § 103(a) as obvious over Fang in view of Coggio et al. is overcome. Reconsideration and withdrawal of the rejection is respectfully requested.

In view of the above, it is submitted that the application is in condition for allowance. Reconsideration of the application is requested.

Respectfully submitted,

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